Computer Science & Engineering

Sr. No.	Course Code	Course Name	L	T	P	Credits
1	CS3BS06	Engineering Mathematics - III	3	1	0	4
2	CS3CO04	Computer Graphics & Multimedia	3	0	2	4
3	CS3CO18	Data Communication	4	0	0	4
4	CS3CO06	Database Management System	3	0	2	4
5	CS3CO08	Computer Programming - II	2	0	2	3
6	CS3CO09	Operating Systems	3	1	2	5
7	EN3MC03	Technical Communication	2	0	0	0
		Total	**20**	**2**	**8**	**24**
				30		

| Course Code | Course Name | Hours per Week | | | Total |
		L	T	P	Credit
CS3BS06	Engineering Mathematics – III	3	1	0	4

Unit I Functions of Complex Variables
Functions of complex variables: Analytic functions, Harmonic Conjugate functions, Cauchy-Riemann Equations, Complex Line Integral, Cauchy's Theorem, Cauchy's Integral formula, Residues, Residue Theorem, Application of Residue theorem for evaluation of real definite Integrals.

Unit II Numerical Analysis -I
Errors and Approximations, Difference Operators, Interpolation with equal intervals: Newton Forward and Backward Formulae, Central Interpolation Formulae: Gauss, Bessel's and Sterling's formula, Interpolation with unequal intervals: Lagrange's and Divided difference formulae, Numerical Integration by Trapezoidal, Simpson's and Weddle's rules.

Unit III Numerical Analysis -II
Solution of Algebraic and Transcendental Equations : Regula Falsi Method , Newton-Raphson formula and Iterative Method, Solution of Simultaneous linear equations by Gauss Elimination, Gauss-Siedel Iterative Method. Numerical Solution of Ordinary differential equations: Taylor's Series, Picard's, Runge-Kutta and Milne's Predictor and Corrector Methods.

Unit IV Operations Research - I
Introduction to Operations Research, Definition, Models, Scope, Characteristics and Limitations of Operations Research, Importance of Operations Research in Decision Making.
Introduction to Linear Programming Problem, Mathematical formulation,Solution of Linear Programming Problem by Graphical, Simplex and Big - M Methods.

Unit V Operations Research - II
Markov Chain Analysis: Introduction, Transition Probability Matrix, n-Step Transition Probability Matrix, Steady State Conditions and Application of Markov Chain.
Queuing Theory: Introduction, Essential features of Queuing System, Single Server/Single Queue with infinite capacity of system (MM1/∞/FCFS) (simple problems only).

Text Books
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi.
2. M.K.Jain, Iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publication.
3. P.K Gupta, D.S. Heera, Problem in Operations Research, S.Chand and Co.

References:
1. B .V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd, New Delhi.
2. J.K. Sharma, Operations Research: Theory and Applications, Macmillan India Ltd.

Course Code	Course Name	Hours per Week			Total Credit
		L	T	P	
CS3CO04	Computer Graphics & Multimedia	3	0	2	4

Unit-I
Introduction to Raster Scan Displays, Pixels, Frame Buffer, Vector & Character Generation, Random Scan Systems, Display Devices, Scan Conversion Techniques, Line Drawing: Simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circle Drawing and Bresenham's Algorithm, Polygon Fill Algorithm: Boundary-Fill and Flood-Fill Algorithms.

Unit-II
2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection, Inverse Transformation, Homogenous Coordinate System, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms.

Unit-III
3-D Transformations: Translation, Rotation and Scaling. Parallel & Perspective Projection: Types of Parallel & Perspective Projection, Hidden Surface Elimination: Depth Comparison, Back Face Detection Algorithm, Painter's Algorithm, and Z-Buffer Algorithm.

Unit-IV
Curve Generation, Bezier and B-spline Methods. Basic Illumination Model: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Ray Tracing, Color Models like RGB, YIQ, CMY, HSV.

Unit V
Multimedia: Characteristics of a Multimedia Presentation, Multimedia Architecture, Text – Types, Unicode Standard, Text File Formats, Audio- Components of an Audio System, Digital Audio, Digital Audio Processing, Audio File Formats, Video- Digital Video, Digital Video Processing, Video File Formats.
Animation: Uses of Animation, Principles of Animation, 3D Animation, Animation File Formats, Animation Software, MPEG Standards.

Text Book
1. D. Hearn, M.P. Becker, Computer Graphics, Pearson Pub.
2. T. Vaughan, Multimedia: Making it works, Tata McGraw-Hill.

References
1. R. Parekh, Principles of Multimedia, Tata McGraw Hill.
2. D.F. Rogers, Procedural Elements of Computer Graphics, Tata McGraw Hill.
3. R.K. Maurya, Computer Graphics with Virtual Reality System, Wiley India.

Course Code	Course Name	Hours per Week			Total Hrs.	Total Credit
		L	T	P		
CS3CO18	Data Communication	4	0	0	4	4

UNIT-I
Introduction to digital communications, Components, Data Representation, Data Flow. Analog and Digital Signals their representation, Transmission Impairment, Data Rate Limits-Nyquist's theorem, Shannon's theorem, Performance, Signal propagation, Signal types, Transmission mode and techniques, Transmission Media-Guided and Non-Guided. Various connectors, Satellite Communication. Modulation and Demodulation of Signals. Multiplexing: FDM, TDM, and WDM, Space Division Multiplexing, QAM.

UNIT-II
Encoding of Signals -Analog to Digital Conversion, Digital to Analog conversion, - Unipolar, Polar, Bipolar line & block codes, , Spread Spectrum-FHSS, DHSS, CDMA. Data compression-Frequency dependant codes, Run length encoding, Relative encoding, LZCompression, Image and multimedia compression.

UNIT-III
Switched Communication Networks: Circuit, Message, Packet & Hybrid Switching, Data Gram Network, Virtual Circuit Network Connection oriented services Vs Connectionless services. Public Switching Telephone Network, Digital Subscriber Line, ADSL, HDSL, SDSL, VDSL, X.25 and ISDN. Leased Line Base Networks vs Broadband, Asynchronous Transfer Mode-Protocol Architecture, logical connections, ATM cells and its transmission. Study of various types of topology and their comparative study. Signalling-Broadband vs Baseband. T1 and E1 carrier.

UNIT-IV
Reference model- OSI and TCP/IP model and its comparison, Layers in the model and its requirement, critiques of OSI and TCP/IP model, Use of Computer Networks. ISP and their classes, Architecture of Internet. Addressing-Physical, Logical, Port. Hubs, Repeater, Media Converter, Rack, LIU, POP, NOC, Wireless Access Point, PAN, LAN, WAN, GAN classification. Key factors in evolution of Data Communication. Various Generation of Network. Peer to Peer Protocols and service model.

UNIIT-V
Data Link Layer:-Transmission Errors : Content Error ,Error detection &Error correction ,Bit error rate , Error detection methods: Parity checking , Checksum Error Detection ,Cyclic Redundancy Check ,Hamming code , Interleaved codes , Block Parity , Convolution code. Framing, Flow error Control for Noisy and Noiseless Channel-ARQ, Sliding Window Protocol, HDLC and PPP. L-2 Switches, Bridges.

Text Book
1. Andrew S. Tannenbaum, Computer Networks, Pearson Education.
2. William Stallings, Data and Computer Communication, Pearson Education.
3. V Edition, Behrouz A.Fourouzan, Data Communication and Networking, Mc Graw Hill Publication.

Reference Book
1. Aftab Ahmad, Data Communication Principles for fixed and wireless networks-, Kluwer Academic Publishers.
2. Gilbert Held, Data Communications Networking Devices: Operation, Utilization, LAN and WAN Internetworking, John Wiley and Sons.
3. Alberto Leon-Garcia, Indra Widjaja, Communication Networks-Fundamental concepts and key Architecture, TMH.

Course Code	Course Name	Hours per Week			Total Hrs.	Total Credit
		L	T	P		
CS3CO06	Database Management System	3	0	2	5	4

Unit I
Basic Concepts: Data vs Information, Definition of Database, Advantages of Database Systems, Components of DBMS, DBMS Architecture and Data Independence, Data modeling, Entity Relationship Model, Relational, Network, Hierarchical and Object Oriented Models. Data Modeling Using The Entity Relationship Model.

Unit II
Relational Database: Relational Databases, Relational Algebra, Relational Algebra Operation, Tuple Relational Calculus, Domain Relational Calculus. Data Definition with SQL, Inserts, Delete and Update Statements in SQL, Views, Data Manipulation with SQL, PL/ SQL constructs: Triggers, Cursors etc.

Unit III
Database Design: Design Guidelines, Key concepts, Relational Database Design, Integrity Constraints, Domain Constraints, Referential Integrity, Functional Dependency, decomposition, Normalization Using Functional Dependencies: Normal Forms, First, Second and Third Normal Forms. Boyce Codd Normal Form, Multivalued Dependencies and Forth Normal Form, Join Dependencies and Fifth Normal Form, Decomosition in 2NF, 3NF and BCNF.

Unit IV
Database Transactions Processing: Introduction to Transaction Processing, Transaction Concepts, Desirable Properties of Transactions, Schedules, Concepts of Recoverability and Serializability, Concurrency control: introduction, locking protocols.

Unit V
Query Processing and Optimization, File organization and indexes, hashing techniques, B tree, B+ tree etc. Introduction to advanced databases: Distributed databases, Object oriented databases, mobile and web databases, Introduction to data warehousing and mining.

Text Books:
1. F.R. Mcfadden, J. Hoffer, M. Prescot, Modern Database Management Addison Wesley.
2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database System, Pearson Education Asia.

Reference Books:
1. C.J. Date, An Introduction to Database Systems, Pearson Education Asia.
2. Henry F Korth, Abraham Silbershatz, Database System Concepts, Mc Graw Hill .

Tentative List of Lab Assignments:

1. Designing an E-R model.
2. Solving basic SQL assignment (DDL and DML commands).
3. Applying unique and referential integrity constraints using SQL.
4. Applying Like predicate, Group By, Having Clause using SQL.
5. Solving SQL assignment involving nested and join queries.
6. Demonstrate views and triggers using SQL.
7. Demonstrate PL/SQL block constructions.
8. Minor Project on designing/developing a database application.
9. Case study of any contemporary DBMS.

Course Code	Course Name	Hours per Week			Total Hrs.	Total Credit
		L	T	P		
CS3CO08	Computer Programming-II	2	0	2	4	3

Unit I

Introduction to .NET Framework, Features of .NET Framework, Architecture and Component of .NET Framework, Overview of CLR, Class Library, Data Types, Literals, and Variables, Operators, Program Control Statements, Basic Features of C#.

OOPs Concept: Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures, Enumeration.

Unit II

Advanced Features of C#: Interfaces, Arrays, Indexers and Collections, Generics, LINQ, Strings and Regular Expressions, Using I/O, Exceptions Handling, Delegates and Events, Multithreading.

Unit III

Introduction to Windows Forms, System Windows, Forms Control, User Defined Control, Understanding and handling controls events, WPF, Create Windows Application .

Unit IV

ADO.NET, Component Object Model, ODBC, OLEDB, and SQL Connected Mode, Disconnected Mode, Dataset, and Data Reader. Data Base Controls: Overview of Data Access Data Control using Grid View Controls, using Details View and Frame View Controls, ADO.NET Data Readers.

Unit V

Introduction to ASP.NET Framework, Overview of ASP.NET Control, Understanding HTML Controls, Study of Standard Controls, Validations Controls, Rich Controls.

Introduction of XML: XML, Structure and Syntax of XML, Document Type Definition (DTD), XML Schema, and Document Object Model.

Text Books:
1. Herbert Schildt, C# 4.0 : The Complete Reference , Mc Graw Hill Publication.
2. Harvey Deitel, Paul Deitel, C# for Programmers, Pearson Education.

Reference Books:
1. E. Balagurusamy, Programming in C#, Tata McGraw Hill Publication.
2. Daniel Minoli, Emma Minoli, Web Commerce Technology Handbook, Tata McGraw Hill.
3. M. McDonald, ASP .Net Complete Reference. Tata McGraw Hill.

List of Experiments/ program (Expandable):

1. **Console Application :**
   1. Demonstrate with Data Types, Literals ,Variables and Operators.
   2. Demonstrate with Program Control Statements.
   3. Demonstrate with OOPs Concept: Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Constructor, Types of Constructor.
   4. Demonstrate with Structures, Enumeration.
   5. Demonstrate with Advanced Features of C#: Interfaces, Arrays, Indexers and Collections, Generics, LINQ.
   6. Demonstrate with Strings and Regular Expressions.
   7. Demonstrate with Using I/O, Exceptions Handling.
   8. Demonstrate with Delegates and Events.
   9. Demonstrate with Multithreading.

2. **Windows Application :**
   1. Create an application for Calculator using windows forms.
   2. Create an application of Array element search using windows forms.
   3. Create an application of handling exceptions using windows forms.
   4. Create an application to Perform String Manipulation with the String Builder and String Classes using windows forms.
   5. Create an application for events handling using windows forms.
   6. Create an application for any real world problem using windows forms.

3. **Web based Application :**
   1. Creating Login Form with Authentication For User Login Using C#.
   2. Using the System .Net Web Client to Retrieve or Upload Data with C# .
   3. Reading & Writing XML Documents with the XML Text,Reader/Writer Class & C# .
   4. Working with Page using ASP .Net.
   5. Working with Forms using ASP .Net.
   6. Data Sources access through ADO.Net.
   7. Working with Data readers, Transactions.
   8. Creating Web Application.

Course Code	Course Name	Hours per Week			Total Credit
		L	T	P	
CS3CO09	Operating Systems	3	1	2	5

Unit I

Introduction Language Processors, Language Processing Activities and Language Processors Development Tools, Assemblers, Compiler, Macros and Macro Processors, Linkers, Introduction to OS. Operating system functions, evaluation of O.S., Different types of O.S.: Batch, Multi-Programmed, Time-Sharing, Real-Time, Distributed, Parallel.

Unit II

Process: Concept of Processes, Process Scheduling. Operations on Processes, Cooperating Processes, Inter-Process Communication. Precedence Graphs, Critical Section Problem, Semaphores, Threads.
CPU Scheduling: Scheduling Criteria, Preemptive & Non-Preemptive Scheduling, Scheduling Algorithms, Algorithm Evaluation, Multi-Processor Scheduling, Deadlock: Deadlock Problem, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock, Methods for Deadlock Handling.

Unit III

Memory Management: Concepts of Memory Management, Logical and Physical Address Space, Swapping, Fixed and Dynamic Partitions, Best Fit, First Fit and Worst Fit Allocation, Paging, Segmentation, and Paging Combined With Segmentation.

Unit IV

Concepts of Virtual Memory, Cache Memory Organization, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing, Demand Segmentation, Role of Operating System in Security, Security Breaches, System Protection, and Password Management.

Unit V

Disk Scheduling, File Concepts, File Manager, File Organization, Access Methods, Allocation Methods, Free Space Managements, Directory Systems, File Protection, File Organization & Access Mechanism, File Sharing Implement Issue, File Management in Linux, Introduction to Distributed Systems.

Text Books:
1. A. Silberschatz, P. Galvin, Operating Systems Concepts, Wiley Publications.
2. Andrew S. Tenenbaum, Modern Operating Systems, Pearson Education Asia.

Reference Books:
1. Terrence Chan, UNIX System Programming Using C++, Prentice Hall India.
2. W. Richard Stevens, Advanced Programming in UNIX Environment, Pearson Education.
3. William Stallings, Operating Systems, Pearson Education Asia.

Course Code	Course Name	Hours per Week			Total Hrs.	Total Credit
		L	T	P		
EN3MC03	Technical Communication	2	0	0	2	0

Unit I. **Communication**: Difference between general and Technical Communication, Barriers to Communication, Verbal/ Non Verbal Communication, Body language , flow, patterns, types of communication.

Unit II. **Confidence Building** : Self evaluation and development, SWOT Analysis, overcoming hesitation and fear of facing public, exercises for confidence building, concepts and elements of emotional intelligence, significance.

Unit III. **Business Correspondence** – Business letters, formats, parts and layouts of business letters. sales letters: job applications, resume writing, applications, calling quotations, sending quotation, placing orders, complaints, and aftermath. Email Etiquettes.

Unit IV. **Report Writing** – Business letters, formats, parts and layouts of business letters. sales letters: job applications, resume writing, applications, calling quotations, sending quotation, placing orders, complaints, and aftermath. Email Etiquettes.

Unit V. **Formal Presentation**- Organising data, assimilating, preparing slides, designing presentations, basic personality traits. Interviews, group discussion

Text Books:
1. R C Sharma, Krishna Mohan, Business Correspondance and Report Writing, Tata Mc Graw Hill.
2. Ashraf Rizvi, Effective Technical Communication, Tata Mc Graw Hill.

Reference Books:
1. P N Kharu Varinder Gandhi, Communication Skills in English, University Science Press (Laxmi Publication, New Delhi).
2. Herta A. Murphy, Herbert William Hildebrandt, Jane Powel Thomas, Effective Business Communication, Mc Graw Hill

Web Source:
http://study.com/academy/lession/communication-skills-definition-examples.html
https://books.google.co.in/books?
Open Learning Source:
https:/onlinecourses.nptel.ac.in